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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,617	09/30/2003	Charles R. Szmanda	52134	4206
21874	7590	08/17/2006		
EDWARDS & ANGELL, LLP P.O. BOX 55874 BOSTON, MA 02205			EXAMINER ZACHARIA, RAMSEY E	
			ART UNIT	PAPER NUMBER

1773

DATE MAILED: 08/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/674,617

Applicant(s)

SZMANDA ET AL.

Examiner

Ramsey Zacharia

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 07 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-12 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-12, 21, 22 and 24 is/are rejected.
- 7) ☒ Claim(s) 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07 August 2006 has been entered.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Objections***

3. Claim 1 is objected to because of the following informalities: the term "polymer" is repeated in the preamble of the claim. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

4. Claims 1-5 and 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 6,423,412) in view of Chung et al. (US 6,355,749).

Zhang et al. teach an electrical device comprising a layer of a ferroelectric polymer subjected to electron beam radiation (column 2, lines 42-54). The polymer may be a copolymer of 50-86 mol% vinylidene fluoride and 14-50 mol% trifluoroethylene (column 5, lines 33-45).

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The film may be made by casting a solution of the polymer in dimethyl formamide as the solvent (column 5, lines 46-53).

Regarding the atomic force microscopy roughness, crystalline domain size, coercivity field strength, polling fatigue, and differential permittivity, these properties appear to be a function of the solvent used in forming the film (see page 8, line 29-page 9, line 18 and Figure 2). Since Zhang et al. uses the same polymer material (copolymer of trifluoroethylene and vinylidene fluoride) and forms the film from a solvent having a  $\delta_v$  value of greater than 8.5 (cal/cc)<sup>1/2</sup>, the ferroelectric film of Zhang et al. should inherently have an atomic force microscopy roughness, crystalline domain size, coercivity field strength, polling fatigue, and differential permittivity that meets the limitations of the instant claims.

Zhang et al. do not teach the use of one of the solvents recited in claim 1. However, Zhang et al. do teach using dimethyl formamide or methyl ethyl ketone.

Chung et al. is directed to a ferroelectric polymer comprising 50-80 mol% of vinylidene fluoride and 15-40 mol% of trifluoroethylene (column 4, lines 54-65). The polymer may be formed into films by casting a solution of the polymer in a solvent (column 7, lines 21-25). Suitable solvents include dimethyl formamide, dimethyl sulfoxide, and dimethyl acetamide (column 10, lines 9-13).

Chung et al. show that methyl ethyl ketone, dimethyl formamide, dimethyl sulfoxide, and dimethyl acetamide are recognized in the art as equivalent solvents for casting films of ferroelectric vinylidene fluoride polymers. Therefore, because these solvents were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would

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have found it obvious to substitute dimethyl sulfoxide or dimethyl acetamide for methyl ethyl ketone or dimethyl formamide.

5. Claims 1-5, 7-12, 21, 22, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 6,423,412) in view of Asakawa (US 6,686,211).

Zhang et al. teach an electrical device comprising a layer of a ferroelectric polymer subjected to electron beam radiation (column 2, lines 42-54). The polymer may be a copolymer of 50-86 mol% vinylidene fluoride and 14-50 mol% trifluoroethylene (column 5, lines 33-45). The film may be made by casting a solution of the polymer in dimethyl formamide as the solvent (column 5, lines 46-53).

Regarding the atomic force microscopy roughness, crystalline domain size, coercivity field strength, polling fatigue, and differential permittivity, these properties appear to be a function of the solvent used in forming the film (see page 8, line 29-page 9, line 18 and Figure 2). Since Zhang et al. uses the same polymer material (copolymer of trifluoroethylene and vinylidene fluoride) and forms the film from a solvent having a  $\delta_v$  value of greater than 8.5 (cal/cc)<sup>1/2</sup>, the ferroelectric film of Zhang et al. should inherently have an atomic force microscopy roughness, crystalline domain size, coercivity field strength, polling fatigue, and differential permittivity that meets the limitations of the instant claims.

Zhang et al. do not teach the use of one of the solvents recited in claim 1 in the disclosed casting process.

Asakawa is directed to a device comprising a ferroelectric capacitor formed from an organic thin film (column 2, lines 14-17). A copolymer of vinylidene fluoride and

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trifluoroethylene is used to form the organic thin film (column 3, lines 53-60). The thin film is formed by dissolving the copolymer in a solvent, such as PGMEA, and casting the resulting solution (column 4, lines 26-42).

Asakawa teach PGMEA as a solvent suitable for casting films of ferroelectric copolymers of vinylidene fluoride and trifluoroethylene. Therefore, it would be obvious to one skilled in the art to use PGMEA as the solvent in Zhang et al. because the courts have held that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination. See MPEP 2144.07.

***Allowable Subject Matter***

6. Claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter.

Claim 23 is directed to a process of forming a ferroelectric polymer film comprising disposing a solution comprising a ferroelectric polymer film precursor and ethyl lactate as a solvent onto a substrate, removing at least a portion of the solvent to product a ferroelectric polymer film, then irradiating the film with an electric beam.

Zhang et al., Chung et al., and Asakawa represent the closest prior art. However, none of these references teach or fairly suggest the use of ethyl lactate as a solvent for forming a ferroelectric polymer film.

***Response to Arguments***

8. Applicant's arguments filed 07 August 2006 regarding the rejection over Zhang et al. in view of Chung et al. have been fully considered but they are not persuasive.

The applicants argue that the references teach against the proposed combination because Chung et al. specifically addresses and distinguishes Zhang et al.

This is not persuasive because Chung et al. is merely cited as a secondary reference showing the suitability of other solvents for the same purpose (casting a ferroelectric film of a vinylidene fluoride/trifluoroethylene copolymer) as Zhang et al. While the invention of Chung et al. may be distinct from that of Zhang et al., the teaching in Chung et al. that solvents such as dimethyl formamide, dimethyl sulfoxide, and dimethyl acetamide can be used to form cast films of ferroelectric vinylidene fluoride/trifluoroethylene copolymer films still provides motivation to for one skilled in the art to use dimethyl sulfoxide or dimethyl acetamide in casting the film of Zhang et al. See MPEP 2144.06 and 2144.07.

The applicants also argue that comparative data of record fully rebuts any *prima facie* case of obviousness. This is not persuasive for at least the reason that the showing is not a comparison of the closest prior art. The results in the instant specification contrast cast films formed using inventive solvents PGMEA and ethyl lactate with films formed from 2-heptanone and diethyl carbonate. However, neither Zhang et al. nor Chung et al. teach the use of 2-heptanone or diethyl carbonate.

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***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramsey Zacharia whose telephone number is (571) 272-1518.

The examiner can normally be reached on Monday through Friday from 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney, can be reached at (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**Ramsey Zacharia**  
**Primary Examiner**  
**Tech Center 1700**